User Manual
ProfiHub A5/B5
5 Channel DP Spur and Repeater component

5 Isolated Channels.
Transparent for all **PROFIBUS DP protocols.**
RS 485 specifications for each channel.
Max. 12 Mbps.
Max. 31 devices per channel.
Max. 1200 m spur line length.
No limit in serial placement.
No address required.
Integrated termination facilities.
Configurable grounding system.

IP 65 classification (ProfiHub A5).
IP 20 classification (ProfiHub B5).

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Safety Guidelines
This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning sign and are marked as follows according to the level of danger:

Draws your attention to important information on handling the product, a particular part of the documentation or the correct functioning of the product.

Warning
This device and its components may only be used for the applications described in this manual and only in connection with devices or components that comply with PROFIBUS and an RS 485 interface. This product can only function correctly and safely if it is transported, stored, set up, installed, operated and maintained as recommended.

Qualified Technicians
Only qualified technicians should be allowed to install and work with this equipment. Qualified technicians are defined as persons who are authorized to commission, to ground, to tag circuits and systems in accordance with established safety practices and standards. It is recommended that the technicians carry a Certified PROFIBUS Installer or Certified PROFIBUS Engineer certificate.

Disclaimer of Liability
We have checked the contents of this manual as much as possible. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the content in this manual is reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

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Important Information

Purpose of the Manual
This manual explains how to put the ProfiHub A5 and ProfiHub B5 into operation.

Recycling and Disposal
The parts of the ProfiHub can be recycled. For further information about environment-friendly recycling and the procedure for disposing your old equipment, please contact:

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1 Product Description

ProfiHub A5 and B5 are advanced, flexible and robust network components for PROFIBUS DP installations, to implement long multi-device spur lines and backbone structures with star/tree segments.

PROFIBUS DP is a high speed communication bus that has to comply with strict rules concerning spur lines, because of possible reflections that could lead to communication disturbances. If spur lines or star segments are required, costly investments in repeaters have to be done.

Innovative components for such applications are the ProfiHub A5 and B5. These are perfect economic solutions to implement reliable spur lines in high speed DP networks. They have the functionality of **5 galvanic isolated transparent repeaters**. This allows network structures with extended spur lines that individually can handle a maximum of 31 devices and a length equal to the main bus. **The ProfiHub A5 and B5 refresh a received message on one Channel and transfer it to all the other Channels (chicken foot topology).**

Fig. 1 - ProfiHub A5 (IP65)

Fig. 2 - ProfiHub B5 (IP20)

Because the ProfiHub A5 and B5 create isolated segments, the devices can now be removed and added during operation. Also electrical bus problems and EMC disturbances in a spur do not spread to the other segments. The intelligent logic and isolation circuits of the ProfiHubs do not change the bit width. This means the ProfiHubs do not have limitations in serial placement. The logic also detects the transmission speed automatically.

To assist the installation work, termination is integrated and can be switched on/off. The grounding concept is also selectable: direct or capacitive grounding. The ProfiHubs are powered by a 10 to 32 DC Voltage (110/230V AC versions are also available). For troubleshooting, maintenance and commissioning the ProfiHubs are equipped with a display on the outside, which indicate the status of each Channel (Data and Error).

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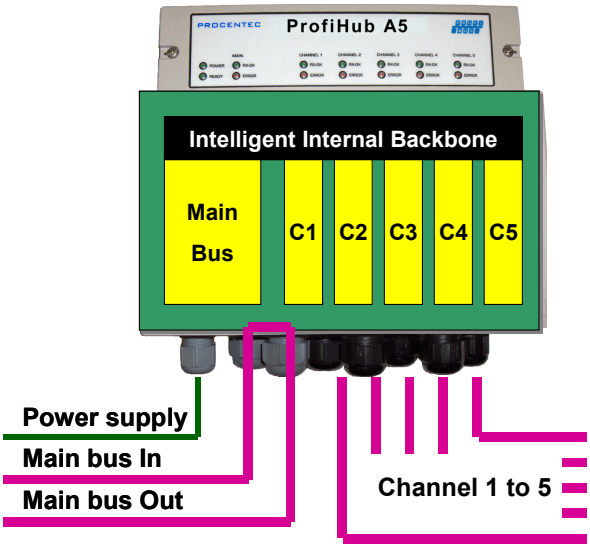
1.1 Product Features



- 5 Galvanic isolated channels (repeater segments).
- Transparent for all **PROFIBUS DP protocols.**
- **DP - RS 485 specifications** for each channel.
- **9,6 Kbps to 12 Mbps**.
- **31 devices** per channel.
- **1200 m spur line length** (depends on transmission speed).
- No limit in serial placement or cascading of ProfiHubs.
- No address required.
- Integrated termination facilities (switches).
- Configurable grounding system (direct or capacitive).
- **IP 65** classification (ProfiHub A5).
- **IP 20** classification (ProfiHub B5).

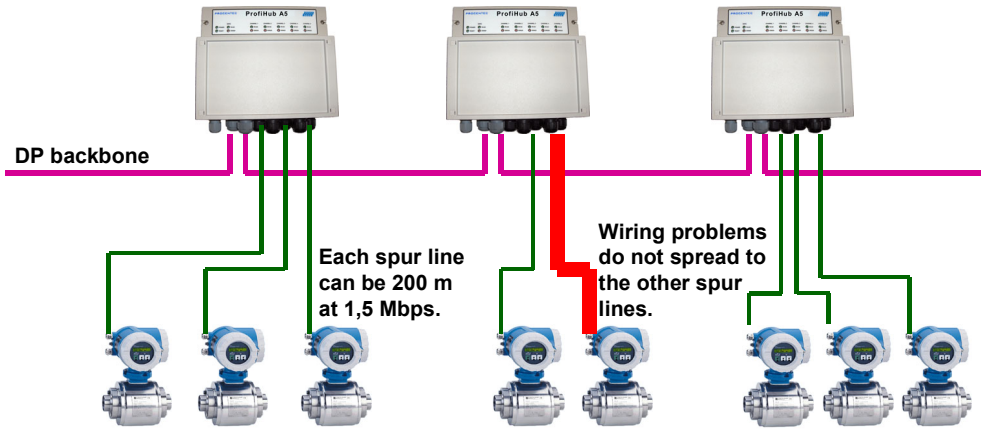


Fig. 3 - Long spur lines to instruments and the possibility to remove/insert them during operation. Short circuit protection on each spur line is automatically provided.

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1.2 Application areas

- Dynamic spur lines to actuators, flow meters and pH analyzers.
- Removable drives and motors.
- Pull/Plug motor control centers (drawers).
- Roof mounted devices in tank farms.
- Dirty and humid environments.
- Barrier for non galvanic isolated equipment.
- Large star/tree structured networks.
- Outdoor applications with device and cable stress (ProfiHub A5).

1.3 Additional Benefits

- Hot slave **insertion and removal** during operation.
- **Short circuit protection** on each Channel.
- Compact and robust construction.
- Status and error display (per Channel).
- Suitable for all DP cables.
- Conveniently arranged networks.
- Easy extendable installations.
- Standard glands can be replaced with M12 (ProfiHub A5).
- On-board DB9 female connector for maintenance activities (ProfiHub A5).
- Cost Savings.

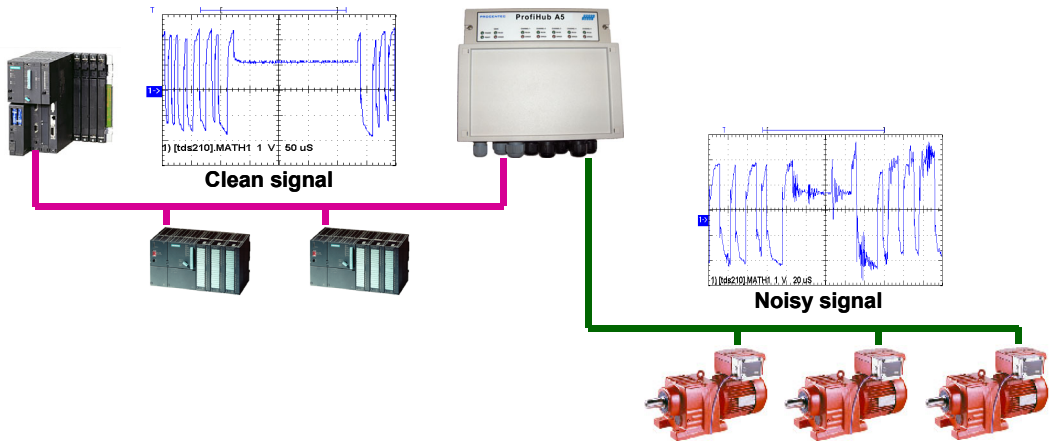

Fig. 4 - Because of the isolation and intelligence the ProfiHub provides, it can be used as a barrier for electrically sensitive segments. This keeps the backbone and other Channels clean.

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1.4 Channel Structure

Every Channel is electrically isolated and internally connected to the transparent intelligent backbone. The termination is switchable and powered by the ProfiHub. The shielding of the PROFIBUS cable can be directly grounded or indirectly grounded (see the next paragraph).

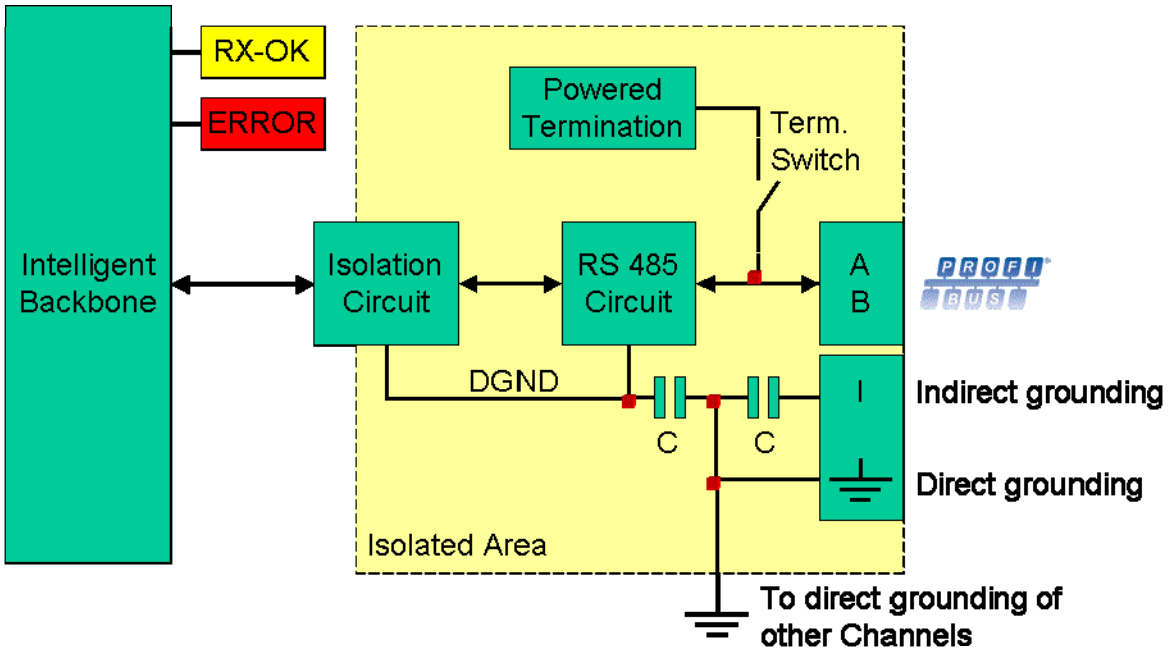

Fig. 5 - Channel structure

1.5 Grounding System

The ProfiHubs can be grounded by 3 methods:
1) Direct grounding
2) Indirect grounding (through a capacitor)
3) Combination of direct and indirect.

In most cases it is recommended always to use Direct Grounding with the power supply and the shielding of the PROFIBUS cables. If you do not want to ground all or some cables to the common ground, the cable shielding should be connected to pin 'I'. A capacitor with a parallel high value resistor will separate the 2 potentials (**Fig. 5**).
If by accident on 1 channel the Direct Grounding is connected with the Indirect Grounding, the Direct Grounding "wins".

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1.6 Cable lengths for PROFIBUS DP

The cables on the Channels and the Main-Channel should comply with the PROFIBUS DP cable specifications for RS 485 (**Fig. 6**).

Baudrate (kbit/s)	9.6	19.2	45.45	93.75	187.5	500	1500	3000	6000	12000
Segment length (m)	1200	1200	1200	1200	1000	400	200	100	100	100
Segment length (feet)	3940	3940	3940	3940	3280	1310	656	328	328	328

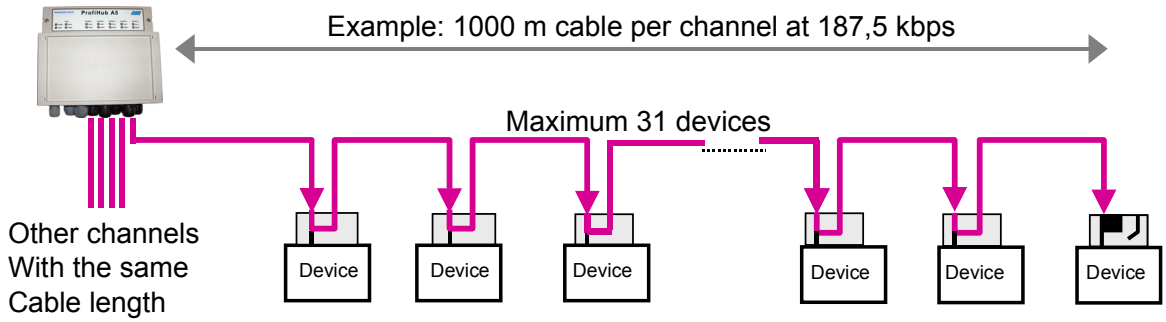

Fig. 6 - Cable lengths for PROFIBUS DP

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1.7 Cable types for PROFIBUS DP

The cable type should comply with the PROFIBUS DP cable specifications for RS 485 (**Fig. 7**).

Parameter	Value
Wires	2 (twisted)
Impedance	135 .. 165 Ohm at 3 to 20 MHz
Capacity	< 30 pF/m
Loop resistance	< 110 Ohm/km
Wire diameter	> 0.64 mm
Wire area	> 0.32 mm^2

Fig. 7 - PROFIBUS DP cable specifications

The ProfiHub A5 can handle cables based on multiple protection sheaths with a diameter between 6 to 12 mm (**Fig. 8**).

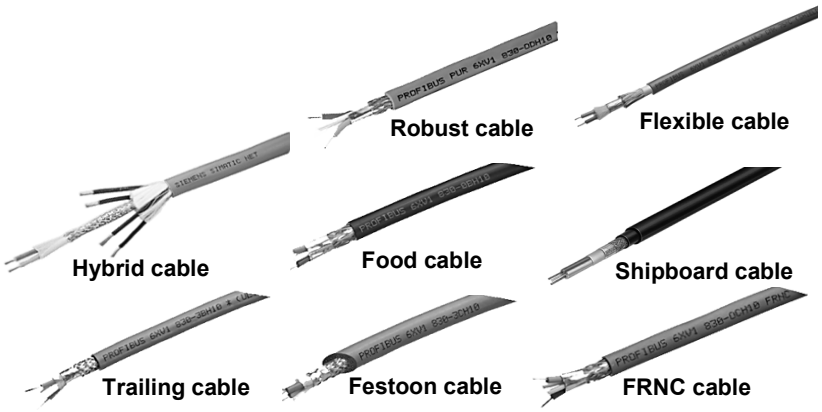

Fig. 8 - Cables with different protection sheaths.

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1.8 Status Display

The Status Display on the ProfiHubs is very useful for diagnostics.

	OFF	Blinking	ON
POWER	😐 Power is not switched on or an internal failure.	☹ Power supply not stable or an internal failure.	☺ Power supply OK.
Main READY	😐 Power is not switched on or an internal failure.	☹ Trying to detect the transmission speed, but has not locked it yet.	☺ The transmission speed has been detected.
Main RX-OK	☹ No communication detected on the Main-Channel.	☺ 1 or more devices communicating on the Main-Channel.	☺ 1 or more devices communicating on the Main-Channel.
Main ERROR	☺ No problem has been detected.	☹ Problem in the cabling has been detected (Main Channel).	☹ Problem in the cabling has been detected (Main Channel).
Channel RX-OK	😐 There is no communication detected (on this Channel).	☺ 1 or more devices communicating (on this Channel).	☺ 1 or more devices communicating (on this Channel).
Channel ERROR	☺ No problem has been detected.	☹ Problem in the cabling has been detected (on this Channel).	☹ Problem in the cabling has been detected (on this Channel).

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1.9 Comparison table

	ProfiHub A5	ProfiHub B5
Area	IP 65	IP 20
Housing	Plastic	Metal
Mounting	Corner screws	DIN-rail
Weight	800 g	650 g
Dimensions	213 x 210 x 95 mm	167 x 111 x 32 mm
PROFIBUS connectors	Screw terminals (inside) Glands (outside)	Screw terminals and DB9 connectors
Alternative connectors	Glands can be replaced with M12 connectors (see chapter 7 Order codes)	No
Termination LEDs	No	Yes
Ground rail	Optional (see chapter 7 Order codes)	Yes

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2 Installation Instructions ProfiHub A5

2.1 Location

The ProfiHub A5 can be installed everywhere in a non-hazardous area that complies with IP 65 (DIN 40 050) and the specified temperature range of -40 to +75° Celsius.

2.2 Position

The ProfiHub A5 can be installed in every position, but it is recommended to install it with the cable glands pointing down to create a more reliable protection against moist and dust (water compartment and glands). In this position it is also easier to read the status display.

2.3 Mounting

The ProfiHub A5 has 4 mounting holes for 4..5 mm screws (**Fig. 9**). To reach the holes on position 1 and 2, the top lid has to be removed.

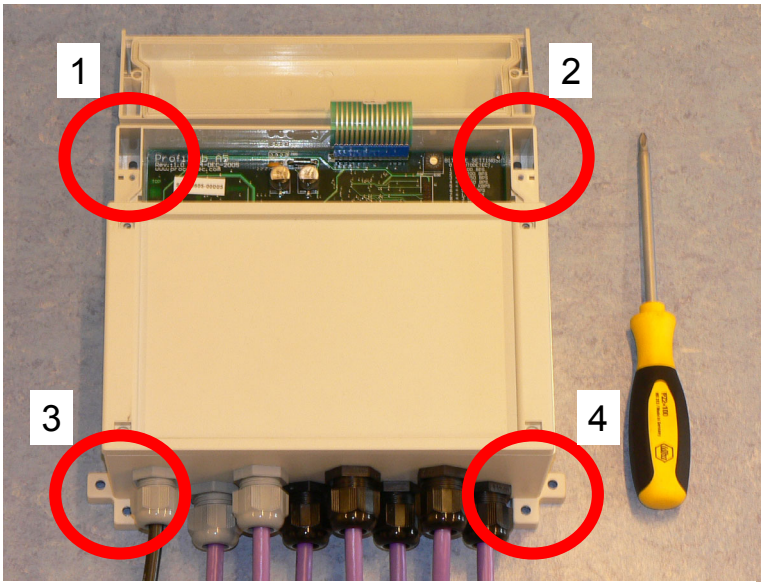

Fig. 9 - Positions of the mounting holes.

1) It is recommended to mount the ProfiHub A5 with at least 4 suitable screws/bolts in position 1, 2, 3 and 4.

2) Be careful with the flat cable that connects the lid with the PCB.

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2.4 Power Supply

The 4-pin screw type power connector is located on the bottom left of the PCB (**Fig. 10**).

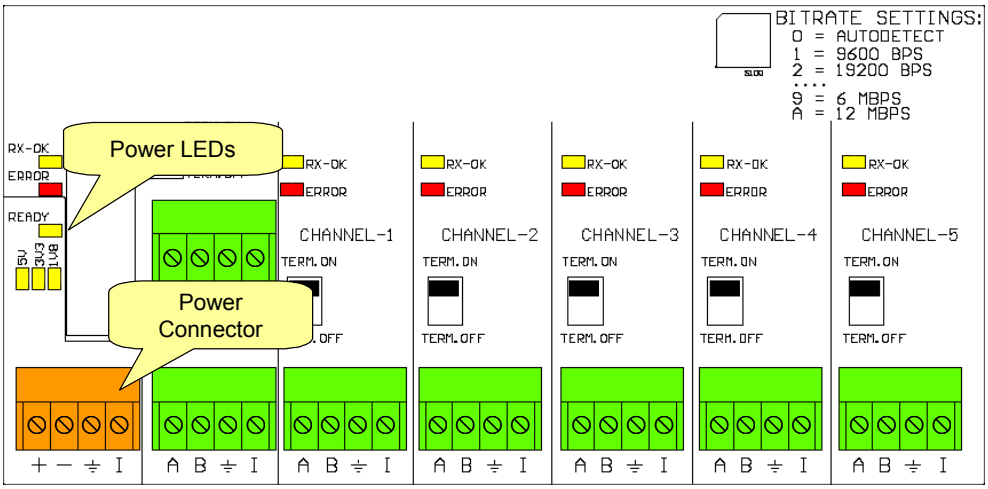

Fig. 10 - Power connector and LEDs

The power supply has to comply with the following specifications:
- Voltage: **10 to 32 Vdc**
- Current: **Min. 130 mA**
- Wire diameter: **< 2,5 mm²**
- Cable thickness: **5 to 10 mm**

Procedure
To connect the 24V supply to the 4-pin screw-type terminal, proceed as follows:
- Strip the insulation from the cable or the conductors for the 24V power supply.
- Secure the conductors in the screw-type terminal.

Note: There is a grounding point that can be used.

To connect the power supply, you need a 3 mm screwdriver.

Testing
If the power is switched on it can be diagnosed by the following indicators on the PCB:
- All the LEDs should be shortly blinking.
- The READY LED is ON or Blinking.
- The voltage LEDs are ON (5V, 3V3 and 1V8).

It is recommended to use a power supply with a ground lead (3-wire).

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2.5 Backbone

Connect the DP backbone cable to the bottom connector of the Main-Channel (**Fig. 11**). If the ProfiHub is not the last device on the bus segment, connect the Bus-Out cable to the top connector of the Main-Channel (**Fig. 11**).

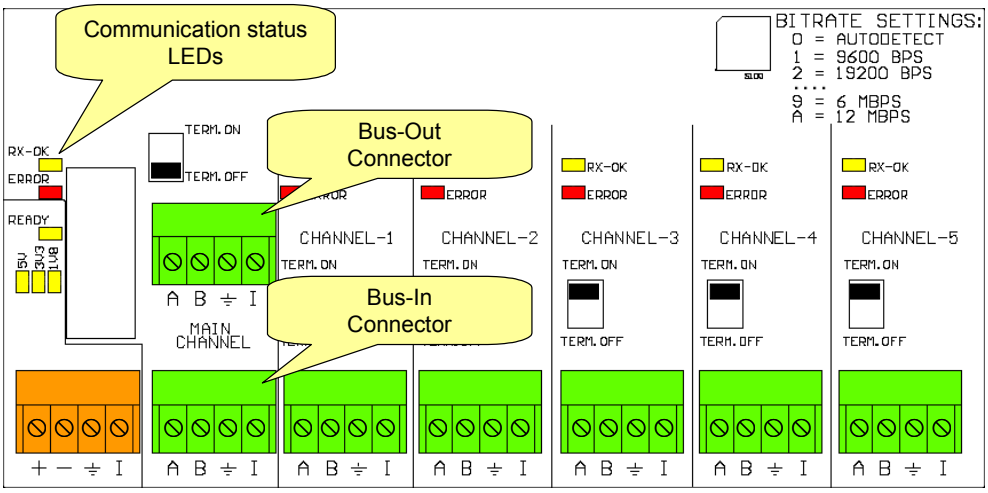

Fig. 11 - PROFIBUS DP backbone connection

Pin Layout of the screw terminals
Pin “A”: Green wire
Pin “B”: Red wire
Pin “I”: Cable shielding *OR*
Pin “⏚”: Cable shielding

Testing
- If the Main-Channel recognizes valid PROFIBUS messages from 1 or more connected devices, the RX-OK LED of this Channel should be blinking.

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2.6 Spur Segments

Connect the spur segments to the connectors of Channel 1 to 5 (**Fig. 12**).

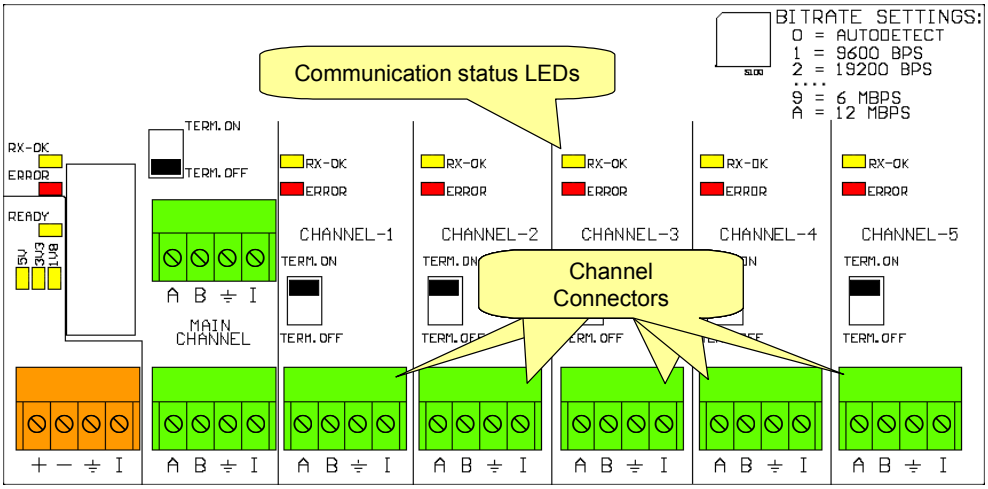

Fig. 12 - PROFIBUS DP spur connectors

Pin Layout of the screw terminals
Pin “A”: Green wire
Pin “B”: Red wire
Pin “I”: Cable shielding *OR*
Pin “⏚”: Cable shielding

Testing
If a Channel recognizes valid PROFIBUS messages from 1 or more connected devices, the RX-OK LED of the specific Channel should be blinking.

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2.7 Termination

The termination of the Main-Channel has been set to OFF by default. If the ProfiHub is the last/first device on the segment, the termination should be set to ON (**Fig. 13**).

The termination of the Channels have been set to ON by default. Because it is assumed that the new segment is started at the ProfiHub (**Fig. 13**).

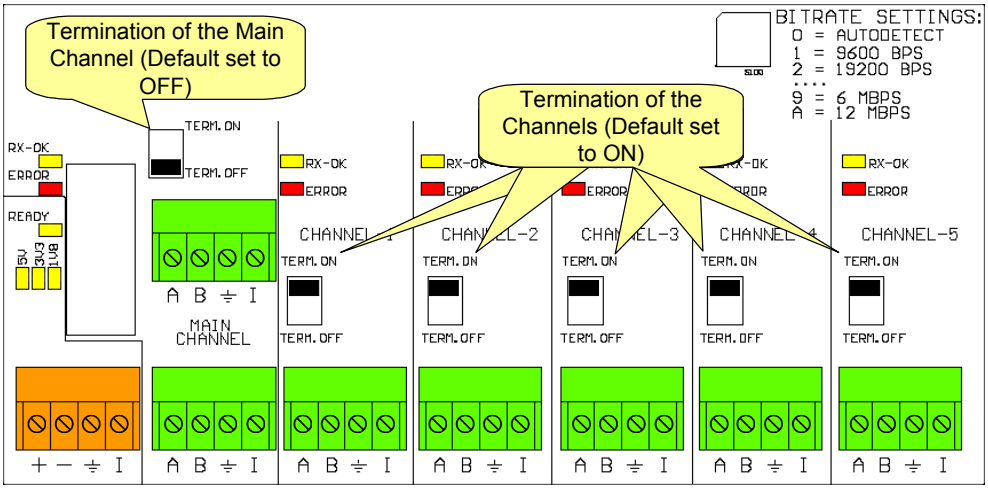

Fig. 13 - Termination Switches

Don't forget to switch the termination ON at the other end of the segment and make sure it is powered continuously.

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2.8 Baudrate switch

The ProfiHub recognizes the transmission speed by default. If it is required that the ProfiHub is locked to a certain transmission speed, switch S100 should be set to the required value (**Fig. 14**). The switch can be reached by removing the top lid.

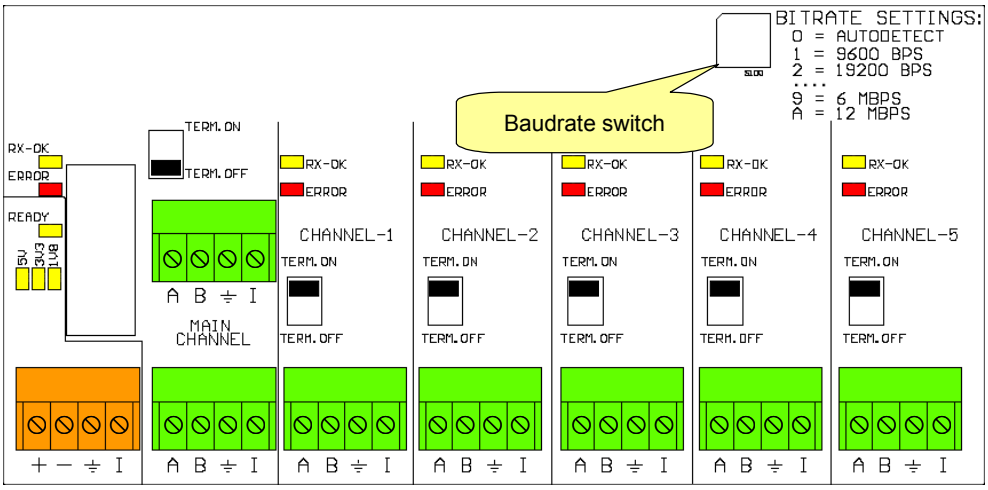

Fig. 14 – Baudrate speed switch

To set the transmission speed, you need a 3 mm screwdriver.

Switch values:
0 = Auto detect (**default**)
1 = 9,6 kbps
2 = 19,2 kbps
3 = 45,45 kbps
4 = 93,75 kbps
5 = 187,5 kbps
6 = 500 kbps
7 = 1500 kbps
8 = 3000 kbps
9 = 6000 kbps
A = 12000 kbps
B .. F = Auto detect

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3 Installation Instructions ProfiHub B5

3.1 Location

The ProfiHub B5 can be installed everywhere in a non-hazardous area that complies with IP 20 (DIN 40 050) and the specified temperature range of -20 to +60° Celsius.

3.2 Position

The ProfiHub B5 can be installed in every position, but it is recommended to install it with the cables pointing down. In this position it is also easier to read the status display.

3.3 Mounting

The ProfiHub B5 has to be mounted on 35 mm DIN-rail with a minimum width of 167 mm.

3.4 Power Supply

The 3-pin screw type power connector is located on the bottom left of the ProfiHub B5 (**Fig. 15**).
1 = **+** (left)
2 = **-** (middle)
3 = **Indirect grounding** (right)

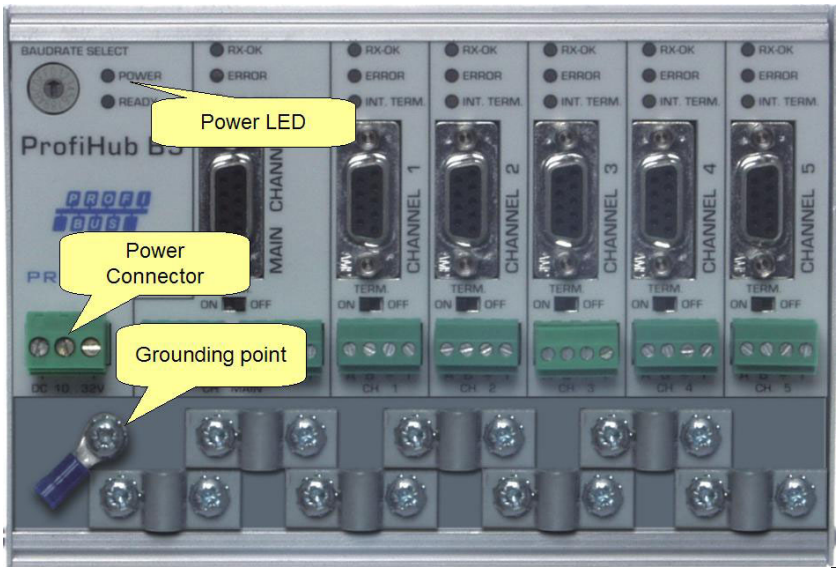

Fig. 15 - Power connector and LEDs

The power supply has to comply with the following specifications:
- Voltage: **10 to 32 Vdc**
- Current: **Min. 130 mA**
- Wire diameter: **< 2,5 mm²**

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Procedure
To connect the 24V supply to the 3-pin screw-type terminal, proceed as follows:
- Strip the insulation from the cable or the conductors for the 24V power supply.
- Secure the conductors in the screw-type terminal.
Note: There is a grounding point that can be used.

To connect the power supply, you need a 3 mm screwdriver.

Testing
If the power is switched on it can be diagnosed by the following indicators:
- All the LEDs should be shortly blinking.
- The POWER LED is ON.
- The READY LED is ON or Blinking.

It is recommended to use a power supply with a ground lead (3-wire).

3.5 Backbone

Connect the DP backbone cable to the bottom-left connector of the Main-Channel (**Fig. 16**). If the ProfiHub is not the last device on the bus segment, connect the Bus-Out cable to the right connector of the Main-Channel (**Fig. 16**). The second method is to place a PROFIBUS standardized plug with an in/out cable on the DB9 connector.

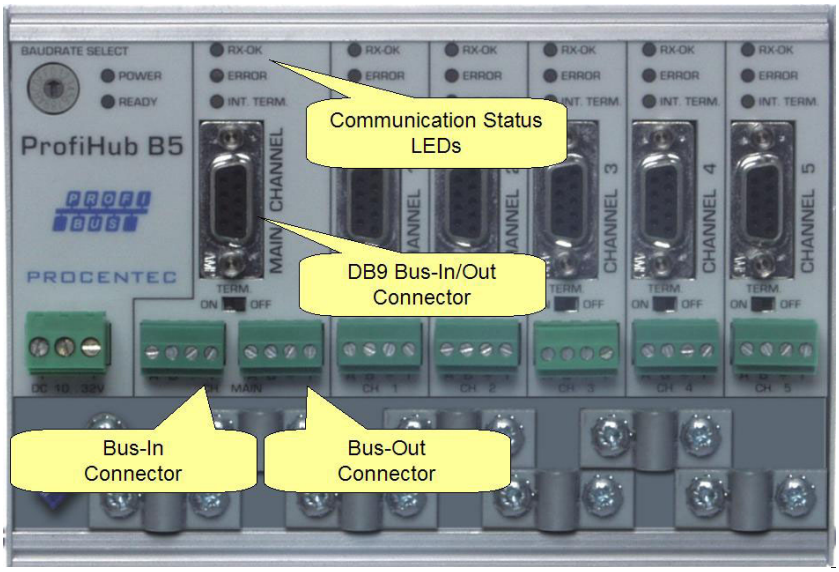

Fig. 16 - PROFIBUS DP backbone connection

Pin layout of the screw terminals:
Pin “A”: Green wire
Pin “B”: Red wire
Pin “I”: Cable shielding *OR*
Pin “⏚”: Cable shielding

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Testing
- If the Main-Channel recognizes valid PROFIBUS messages from 1 or more connected devices, the RX-OK LED of this Channel should be blinking.

3.6 Spur Segments

Connect the spur segments to the connectors of Channel 1 to 5 (**Fig. 17**). The second method is to place a PROFIBUS standardized plug on the DB9 connector of the specific Channel.

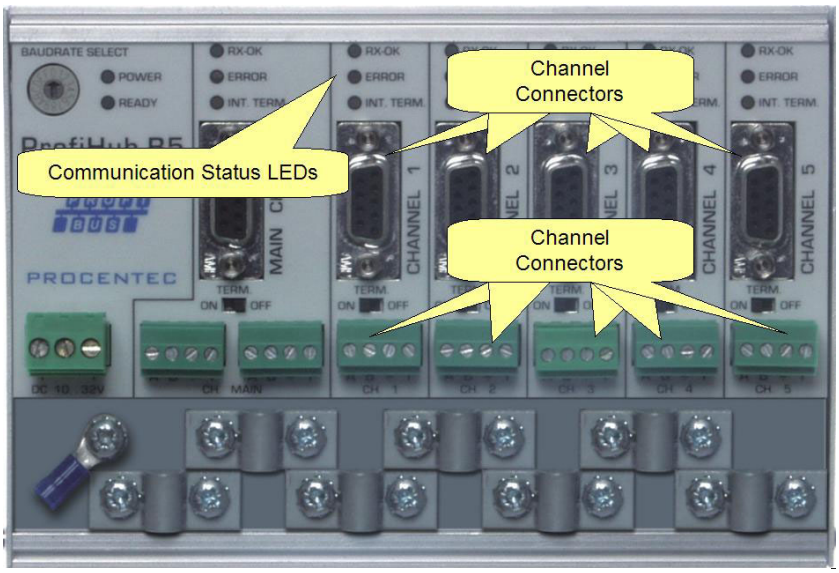

Fig. 17 - PROFIBUS DP spur connectors

Pin layout of the screw terminals:
Pin “A”: Green wire
Pin “B”: Red wire
Pin “I” or “Ground”: Cable shielding
Note: Connecting the cable shielding is not required when the ground clips are used.

Testing
- If the Main-Channel recognizes valid PROFIBUS messages from 1 or more connected devices, the RX-OK LED should be blinking.

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3.7 Termination

The termination of the Main-Channel has been set to OFF by default. If the ProfiHub is the last device on the bus, the termination should be set to ON (**Fig. 18**).

The termination of the Channels have been set to ON by default. Because it is assumed that the new segment is started at the ProfiHub (**Fig. 18**).

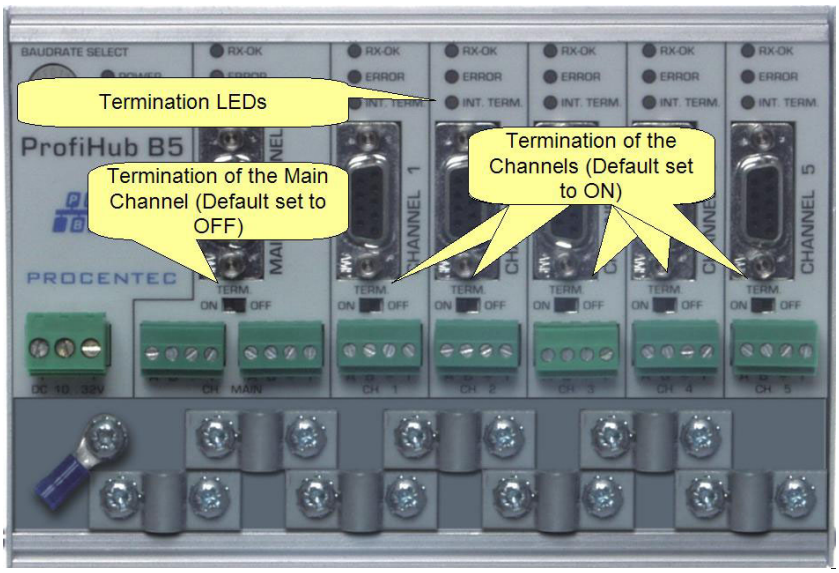

Fig. 18 - Termination Switches

The termination LED of the specific Channel is activated when the termination switch is set to ON.

When the DB9 connector is used and the cable starts at the ProfiHub, it is recommended to use the termination on the DB9 plug and NOT the ProfiHub.

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3.8 Baudrate switch

The ProfiHub B5 recognizes the transmission speed by default. If it is required that the ProfiHub B5 is locked to a certain transmission speed, the baudrate switch should be set to the required value (**Fig. 19**).

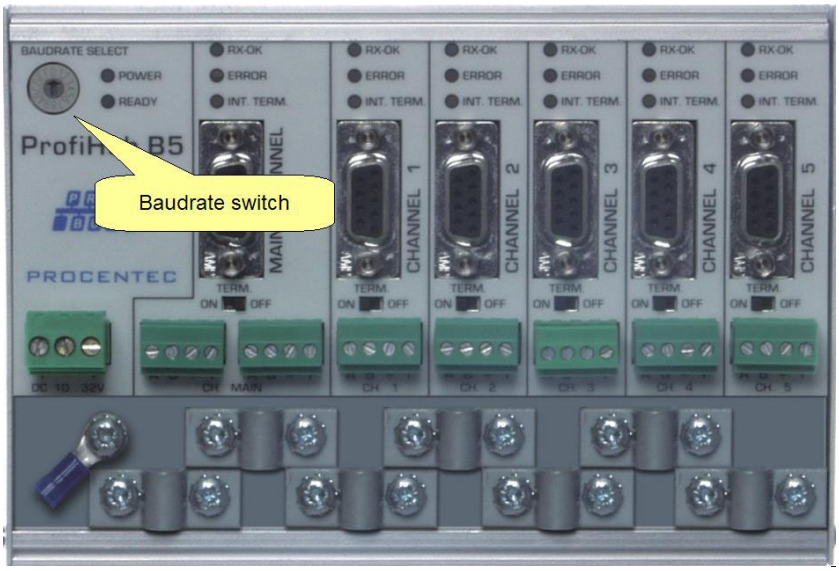

Fig. 19 - Baudrate speed switch

To set the transmission speed, you need a 3 mm screwdriver.

Switch values:
0 = Auto detect (**default**)
1 = 9,6 kbps
2 = 19,2 kbps
3 = 45,45 kbps
4 = 93,75 kbps
5 = 187,5 kbps
6 = 500 kbps
7 = 1500 kbps
8 = 3000 kbps
9 = 6000 kbps
A = 12000 kbps
B .. F = Auto detect

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4 Technical Data ProfiHub A5

Technical Data ProfiHub A5	
Dimensions and weight	
Dimensions L x W x H (mm) with glands Weight Mounting screws	213 x 210 x 95 mm Approximately 800 g 4 to 5 mm
Ambient conditions	
Operating temperature Isolation class	-40 to +75° Celsius IP 65 (DIN 40 050)
Protocol specifications	
Supported Protocols	DP-V0, DP- V1, DP-V2, FDL, MPI, FMS, PROFIsafe, PROFIdrive and any other FDL based protocol.
Transmission speed Transmission speed detection Transmission speed switch	9,6 kbps to 12 Mbps (including 45,45 kbps) Auto detect (default) or settable with a rotary switch 0 = Auto detect (default) 1 = 9,6 kbps 2 = 19,2 kbps 3 = 45,45 kbps 4 = 93,75 kbps 5 = 187,5 kbps 6 = 500 kbps 7 = 1500 kbps 8 = 3000 kbps 9 = 6000 kbps A = 12000 kbps B .. F = Auto detect
Transmission speed detection time	< 10 s (if it is set to auto detect)
Data delay time	1,25 TBit at 9,6 kbps to 93,75 kbps 1,3 TBit at 187,5 kbps to 500 kbps 1,4 TBit at 1,5 Mbps 1,6 TBit at 3 Mbps 2,0 TBit at 6 Mbps 3,0 TBit at 12 Mbps
Delay time jitter	Max. ¼ bit time

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Technical Data ProfiHub A5	
PROFIBUS cable specifications	
Cable lengths	1200 m at 9,6 kbps to 93,75 kbps 1000 m at 187,5 kbps 400 m at 500 kbps 200 m at 1,5 Mbps 100 m at 3 Mbps to 12 Mbps
Cable thickness Wire diameter Wire type	6 to 12 mm < 2,5 mm^2 Stranded or Solid core
Number of devices	Maximum 31 per Channel (including ProfiHubs, OLMs, Laptops/PCs, etc)
Termination	Integrated and switchable. Powered according to IEC 61158 (390/220/390 Ohms) - All Channels (default on) - Main-Channel (default off)
Cascading depth Redundancy	No limits No
Power supply specifications	
Nominal supply voltage Current consumption Power dissipation	10 to 32 Vdc 130 mA at 24 V power supply (all Channels fully loaded) Max. 4,1 W
Reverse polarity protection Cable thickness Wire diameter	Yes 5 to 10 mm < 2,5 mm^2
Others	
MTBF	Not available

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5 Technical Data ProfiHub B5

Technical Data ProfiHub B5	
Dimensions and weight	
Dimensions L x W x H (mm) with screws Weight	167 x 111 x 32 mm Approximately 650 g
Ambient conditions	
Operating temperature Isolation class	-20 to +60° Celsius IP 20 (DIN 40 050)
Protocol specifications	
Supported Protocols	DP-V0, DP- V1, DP-V2, FDL, MPI, FMS, PROFIsafe, PROFIdrive and any other FDL based protocol.
Transmission speed Transmission speed detection Transmission speed switch	9,6 kbps to 12 Mbps (including 45,45 kbps) Auto detect (default) or settable with a rotary switch 0 = Auto detect (default) 1 = 9,6 kbps 2 = 19,2 kbps 3 = 45,45 kbps 4 = 93,75 kbps 5 = 187,5 kbps 6 = 500 kbps 7 = 1500 kbps 8 = 3000 kbps 9 = 6000 kbps A = 12000 kbps B .. F = Auto detect
Transmission speed detection time	< 10 s (if it is set to auto detect)
Data delay time	1,25 TBit at 9,6 kbps to 93,75 kbps 1,3 TBit at 187,5 kbps to 500 kbps 1,4 TBit at 1,5 Mbps 1,6 TBit at 3 Mbps 2,0 TBit at 6 Mbps 3,0 TBit at 12 Mbps
Delay time jitter	Max. ¼ bit time

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Technical Data ProfiHub B5	
PROFIBUS cable specifications	
Cable lengths	1200 m at 9,6 kbps to 93,75 kbps 1000 m at 187,5 kbps 400 m at 500 kbps 200 m at 1,5 Mbps 100 m at 3 Mbps to 12 Mbps
Cable thickness Wire diameter Wire type	10 mm (when the ground rail is used) < 2,5 mm^2 Stranded or Solid core
Number of devices	Maximum 31 per Channel (including ProfiHubs, OLMs, Laptops/PCs, etc)
Termination	Integrated and switchable. Powered according to IEC 61158 (390/220/390 Ohms) - All Channels (default on) - Main-Channel (default off)
Cascading depth Redundancy	No limits No
Power supply specifications	
Nominal supply voltage Current consumption Power dissipation	10 to 32 Vdc 130 mA at 24 V power supply (all Channels fully loaded) Max. 4,1 W
Reverse polarity protection Cable thickness Wire diameter	Yes 10 mm (when the ground rail is used) < 2,5 mm^2
Others	
MTBF	398723 hours based on IEC62380 (RDF-2000 / UTE C 80-810, mathematical model for failure rates).

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6 Sales offices and Distributors

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7 Order codes

Component	Order code	Remarks
ProfiHub A5	16010	Includes mounting set.
Ground rail	16011	The ground rail has to be mounted inside the casing to supply a common grounding area for all cable shielding. It improves the EMC behaviour and it supplies a good construction for vibrations. Not useable for capacitive grounding!
M12 female flange set	16012	Set of 5 pieces (female).
ProfiHub B5	17010	--

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8 Glossary

Address	Unique number of a device connected to the network. With PROFIBUS this can be 0 to 126. 127 is a broadcast address.
Analyzer	Software tool to observe the protocol traffic. Combi-Analyzers can also inspect the signal quality. Other term: Bus Monitor. Example: ProfiTrace.
Backbone	The primary bus cable. Most of the time only the control systems, ProfiHubs and fiber optic couplers are connected to this cable. The field devices are connected behind the ProfiHubs and fiber optic couplers.
Bit Time (TBit)	The bit time TBit is the time, which elapses during the transmission of one bit. It depends on the baudrate and is calculated as follows TBit = 1 (bit) / baudrate (bps). Examples: 12 Mbps --> TBit = 83 ns 1,5 Mbps --> TBit = 667 ns
Busparameters	Settings that define the timing behaviour on the bus. They are defined in the master. Examples: Tslot, MaxTSDR.
C	Capacitance.
DGND	Digital Ground.
DIN	German Institute for Standardization (www.din.de).
DP-V0	DP-V0 is the basic stage of the PROFIBUS DP communication protocol. DP-V0 devices (master and slaves) perform the following basic functionalities: - Cyclic exchange of I/O data between controlling and slave devices - Device, Identifier (module) and Channel related Diagnosis - Parameterization of DP-slaves - Configuration of DP-slaves
DP-V1	DP-V1 is the first stage of extension of PROFIBUS DP after DP-V0. DP-V1 devices shall comply with the following features: - Device related diagnosis is replaced by status and alarms. - The first three octets of the user parameterization data are now standardized - Optionally these devices may support: - Acyclic communication (MS1, MS2) - If alarms are used, MS1 shall be supported

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DP-V2	DP-V2 is the second stage of extension of PROFIBUS DP after DP-V1. DP-V2 devices shall comply with the following features: - Data Exchange Broadcast (DxB) for slave to slave communication (publisher/subscriber principle). - Isochronous Mode (time tick synchronized operating slaves, e.g. drives) - Up- and/or download of Load Region Data (domains) - Clock Control (synchronization within slaves) and Time Stamping - Redundancy.
Electromagnetic Compatibility	*See EMC.*
EMC	The extent to which an electric or electronic device will tolerate electrical interference from other equipment (immunity), and will interfere with other equipment. Within the European Community as well as in other countries it is regulated by law that electric and electronic components and equipment comply with basic standards such as IEC 61000-6-2 or IEC 61326 or corresponding individual product standards.
Hub	A Hub refreshes a signal and passes the information on to all nodes which are connected to the Hub. Data frames which were received on one port are transferred to all the other ports (chicken foot topology).
MPI	Multiple Protocol Interface. Protocol defined by Siemens which uses the layer 1 and 2 of PROFIBUS (FDL).
PCB	Printed Circuit Board.
PROFIBUS DP	Acronym for "PROFIBUS for Decentralized Peripherals". Specification of an open fieldbus system with the following characteristics: - Polling master-slave-system (cyclic communications, MS0) - Flying masters with robin round token passing coordination (MM) - Connection based (MS1) and connectionless (MS2, MS3) acyclic communication between masters and slaves Options (e.g.): - Data exchange broadcast (DXB), i.e. slave to slaves communication - Isochronous mode of slaves - Clock synchronization - Redundancy PROFIBUS DP is standardized within IEC 61158 and IEC 61784, communication profile families 3/1 and 3/2 The term "PROFIBUS DP" also is a synonym for the RS485 based deployments within factory automation.
Repeater	Active physical layer device that receives and retransmits all signals over a different port to increase the distance and number of devices for which signals can be correctly transferred for a given medium.
Spur line	A cable attached to a bus segment with a T-connection . Spurs are not recommended with PROFIBUS DP. They are prohibited with 12 Mbps and PROFIsafe operations. German term is "Stichleitung".

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Stub line	See *Spur line*.
TBit	See *Bit Time*.
Termination	A (powered) resistor network at both ends of a segment to prevent reflections (with PROFIBUS DP the termination has to be powered).
Topology	In a communications network, the pattern of interconnection between network nodes; e.g. bus, ring, star configuration.
PI	PROFIBUS International. The International PROFIBUS Organization based in Karlsruhe.
PNO	PROFIBUS Nutzer Organization. The German PROFIBUS Organization based in Karlsruhe.
Drop cable	See *Spur line*.
Reflection	Part of the original signal that is transmitted back along the cable. It corrupts the original signal.

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9 Certificates

QualityMasters

Stichting QualityMasters hereby declares that

PROCENTEC
WATERINGEN

Has a management system that meets the requirements of the standard

NEN-EN-ISO 9001:2000

For the scope

Providing training courses, technical support, product development and the exploitation of the test laboratory.

Date of issue	11th April 2008
Valid until	11th April 2013
Certificate number	NL 4792

On behalf of Stichting QualityMasters,

N.B. The failure to meet the conditions as set forth in the certification agreement, or non-compliance with the given standard and/or guidelines, may lead to the suspension or cancellation of the certificate.

This certificate remains the property of Stichting Quality Masters.

SRTCI
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PROFIBUS PROCESS FIELD BUS

Certificate for a
PI Competence Center

PI confirms that

PROCENTEC
Dennis van Booma
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THE NETHERLANDS

is a fully accredited
PI Competence Center for PROFIBUS basic and
PROFIBUS PA.

This certificate is granted according to the Quality of Services Agreement for PI Competence Centers and is valid for 2 years, until December 31, 2009.

Karlsruhe, May 05, 2008

(Official in Charge)

Chairmen of PI

Michael Bryant (Chairman)

Jörg Freitag (Deputy Chairman)

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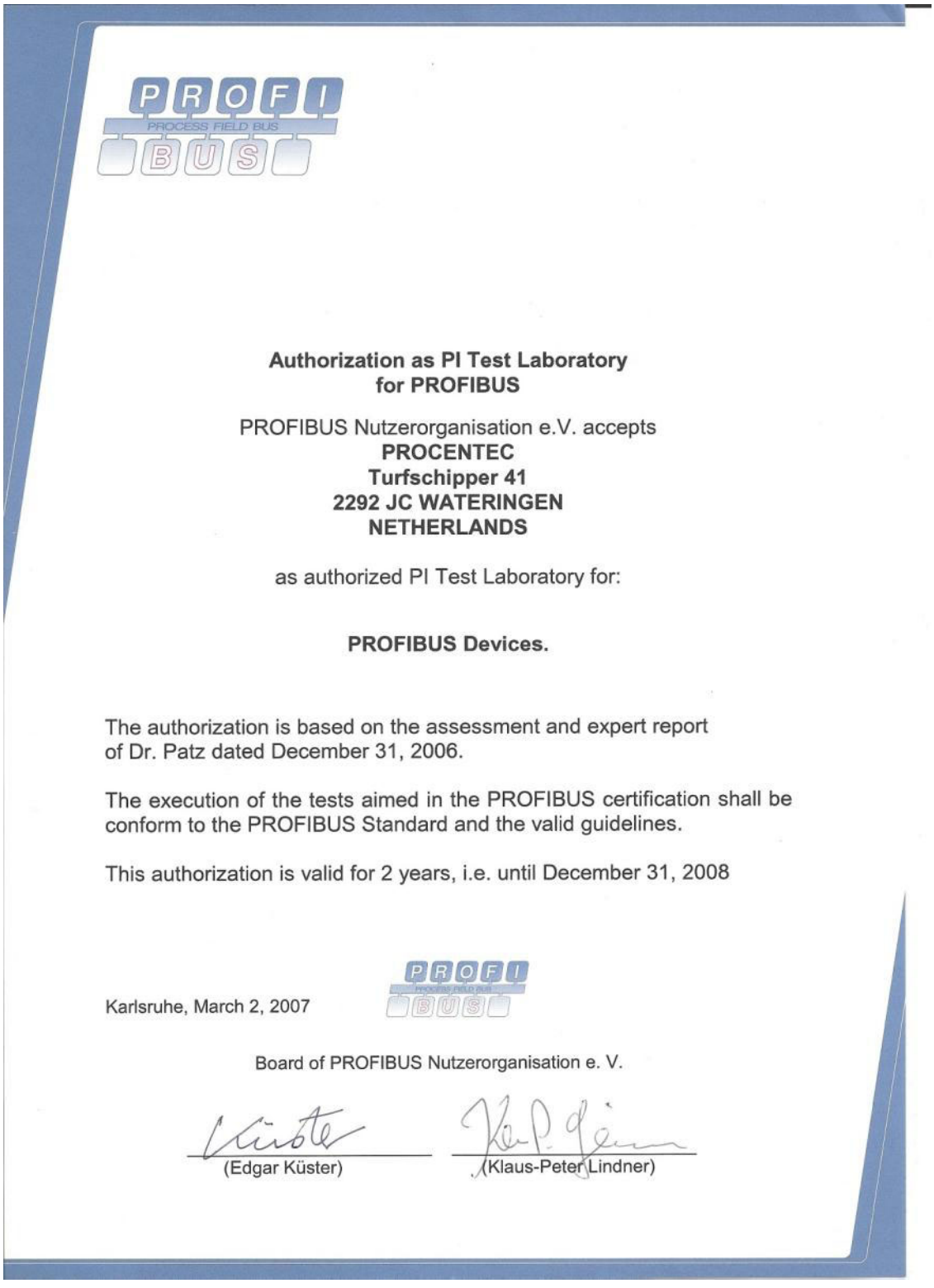

Authorization as PI Test Laboratory for PROFIBUS

PROFIBUS Nutzerorganisation e.V. accepts
PROCENTEC
Turfschipper 41
2292 JC WATERINGEN
NETHERLANDS

as authorized PI Test Laboratory for:

PROFIBUS Devices.

The authorization is based on the assessment and expert report of Dr. Patz dated December 31, 2006.

The execution of the tests aimed in the PROFIBUS certification shall be conform to the PROFIBUS Standard and the valid guidelines.

This authorization is valid for 2 years, i.e. until December 31, 2008

Karlsruhe, March 2, 2007

Board of PROFIBUS Nutzerorganisation e. V.

(Edgar Küster) (Klaus-Peter Lindner)

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10 Revision History

Version 0.3 - First release.
Version 0.4 - Update of technical information. - Addition of the ProfiHub B5 (first part).
Version 0.5 - Update of technical information. - Paragraph with ProfiHub A5/B5 comparison. - Chapter with order codes.
Version 1.1 - Final first release.
Version 2.0 - Updated the Technical Data. - Updated the Distributors. - Added Certificates. - Added Notes.

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11 Next version

- Signal amplitudes.
- Capacity of a channel.
- Description of the ground rail.
- Adjustment of busparameters when cascading a large number of ProfiHubs.
- Use of the diagnostic connector.

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12 Notes

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- ✓ Suitable for straight and 90°, metal or plastic PROFINET plugs.
- ✓ Tests cable shielding!
- ✓ Detects short circuits, wire breaks, swaps, miswiring and split pairs.
- ✓ Large LCD clearly indicates the test results.
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- ✓ Just 1-key-press to start continuous testing.
- ✓ It can also test telephone and coax cable.

www.profinetcabletester.com

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- ✓ Auto baudrate detection.
- ✓ Redundant power supply.
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- ✓ No limit in cascading.
- ✓ Integrated switchable termination.
- ✓ Diagnostic LEDs.
- ✓ DB9 connector for measurements.
- ✓ **IP 20 with DIN-rail mounting.**

www.procentec.com/profihub/b1/en